

# Master electives list For BME/ME

(2023-2024)

## Core courses ME (only ME students)

Code	Course name	Lecturer	Q/TS	EC
8FM20	Clinical module 1 – Diagnostiek en monitoring (dependent on # participants) <ul style="list-style-type: none"><li>• Neurologie (8FM21)</li><li>• Radiologie (8FM22)</li><li>• IC (8FM23)</li></ul>		1 or 3 / <b>DD</b>	7.5
8FM30	Clinical module 2 – Besluitvorming en interventie (dependent on # participants) <ul style="list-style-type: none"><li>• Hart &amp; vaten (8FM31)</li><li>• Oncologie (8FM32)</li><li>• Orthopedie (8FM33)</li><li>• Klinische chemie CZE (8FM34)</li></ul>		1 or 3 / <b>DD</b>	7.5

**DD** = Whole Tuesday and Thursday in Maastricht during Q1/Q3; project runs until halfway Q2/Q4

## Core course RMT (only RMT students)

Code	Course name	Lecturer	Q/TS	EC
8R000	Introduction to RMT	Van Donkelaar	1/ <b>HW</b>	15

**HW** = Lectures and project all days

## Core course MI (only MI students)

Code	Course name	Lecturer	Q/TS	EC
8DM10	Team challenge in medical imaging	Veta	1+2+3/..	5

## Core courses ICMS (only ICMS students)

Code	Course name	Lecturer	Q/TS	EC
8I030	Scientific skills	Van Genderen	3 and 4	2.5
8I040	ICMS lectures 1	Van Genderen	1, 2, 3 or 4	2.5
8I050	ICMS lectures 2	Van Genderen	1, 2, 3 or 4	2.5
8I060	Master thesis communication	Van Genderen	1, 2, 3 or 4	2.5

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## Specialisation courses for BME and ME

Code	Course name	Lecturer	Q/TS	EC
8CM00	Systems medicine	Van Riel	1/D	5
8CM10	Radiation physics	Raaijmakers	1/A <b>a)</b>	2.5
8DM50	Machine learning in Medical Imaging and Biology	Veta	1/B	5
8MM50	Host response to biomaterials	Smits	1/A	5
8SM00	Clinical chemistry	Scharnhorst	1/B1	2.5
8SM50	Chemical Biology	Brunsveld	1/D	5
8VM00	Cardiovascular fluid mechanics	Van de Vosse	1/B	5
3MN170	Molecular biosensing (was 8NM10)	De Jong	2/E	5
5LPE0	Electromagnetic field in MRI	Raaijmakers	2/C1	5
8CM20	Molecular modelling	Markvoort	2/A	5
8MM30	Numerical analysis of continua II	Loerakker	2/C	5
8MM40	Cell mechanobiology and engineering	Kurniawan	2/B	5
8NM00*	Radioisotopes and ionizing radiation in biochemical technology <b>CFK)</b>	Moerdijk	2/B	2.5
8SM10	Protein engineering	Merkx	2/D	2.5
8TM10	Orthopaedic soft tissues: biomechanics and mechanobiology	Foolen	2/D	5
8VM30	Vascular mechanics	Rutten	2/E	5
8VM60	Ultrasound in the (bio)medical engineering	Lopata	2/D	5
8VM70+	Advanced topics in Ultrasound imaging in the (bio)medical engineering	Lopata	2/D	2.5
6EMA61	Advances in molecular chemistry	Palmans	3/E	5
8DM20	Capita selecta medical image analysis	Pluim	3/A+B <b>b)</b>	5
8SM20	Biomaterials	Dankers	3/C	5
8SM30	Capita selecta laboratory medicine	Scharnhorst	3/B1	2.5
8TM00	Bone structure and function	Van Rietbergen	3/B1	5
8VM20	Cardiac function	Bovendeerd	3/D	5
8VM80	Pathophysiology of the cardiovascular system	Van Sambeek	3/B	5
3MN210	Single molecule microscopy of nano materials	De Jong	4/C	5
8CM30	Applied clinical data science	Van Riel	4/E	2.5
8MM10	Microscopy for biological samples	Van Turnhout	4/B1	2.5
8SM40*	Nanomedicine	Van der Meel	4/A	5
8VM40	Cardiovascular fluid-structure interaction	Van de Vosse	4/D	5

\* = Limited number of spots

**CFK)** = 8NM00 students in the "Fysica in de kliniek" certificate fill the first spots

+ = If you already did 8VC00

**a)** = Only on Monday

**b)** = Lectures on Monday only and BZ on Monday afternoon

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(2023-2024)

Code	Course name	Lecturer	Q/TS	EC
8PM00*	Project Molecular biology**	Merkx	1/\$	5
8MM20*	Cell biological techniques and cell-biomaterial interactions**	Dankers	2/\$	5
8PM01*	Project Organic chemistry	Meijer	4/C+E	5

\* = Limited number of spots

\*\* = 8MM20 **or** 8PM00 (not both)

\$ = Individually planned with lecturer

## Specialisation courses for MI track

Code	Course name	Lecturer	Q/TS	EC
8CM10	Radiation physics	Raaijmakers	1/A <b>a)</b>	2.5
8DM50	Machine learning in Medical Imaging and Biology	Veta	1/B	5
8NM00*	Radioisotopes and ionizing radiation in biochemical technology <b>CFK)</b>	Moerdijk	2/B	2.5
8VM60	Ultrasound in the (bio)medical engineering	Lopata	2/D	5
8VM70+	Advanced topics in Ultrasound imaging in the (bio)medical engineering	Lopata	2/D	2.5
5LPE0	Electromagnetic fields in MRI	Raaijmakers	2/C	5
8DM20	Capita selecta medical image analysis	Pluim	3/A+B1 <b>b)</b>	5
8MM10	Microscopy for biological samples	Van Turnhout	4/B1	2.5

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## Specialisation courses for MI track – Utrecht University

Code	Course name	Lecturer	Q/TS	EC
BMB502417	Programming for medical imaging (8UU00)	Kuijf	1/C+D	5
BMB4708022	AI for Medical Imaging (8UU22)	Maspero	2	2.5
BMB4709022	Diffusion MRI (8UU23)	Leemans	2	2.5
BMB4710022	Image-guided ultrasound therapy (8UU24)		3	2.5
BMB502717	Advanced MR Physics 1 (8UU02)	Bartels	2/A+E	5
BMB502617	Radiotherapy Physics (8UU04)	Van Asselen	3/B+D	5
BMB503317	Advanced MR Physics 2 (8UU03)	Siero	3/C+D	5

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## Courses from other departments to be chosen as specialisation elective

Only 1 of these courses as specialisation elective

Code	Course name	Lecturer	Dep		EC
2MMA80	Mathematics of neural networks	Duits	W&I	Please check OSIRIS for the current programming	5
3MA100	Physics behind medical technology: equipment and physiology	Van Pul	TN		5
4MM20	Computational and experimental micro-mechanics	Hoefnagels	W		5
4UM00*	Microfabrication methods	Den Toonder	W		5
4UM10*	Microfluidics put-to-work (last year 2024)	Wyss	W		5
5LSB0	Monitoring respiration and circulation	Woerlee	EE		5
5LSC0	Biomedical sensing technology (indien 8VB10 niet is gedaan)	Mischi	EE		5
5SSD0	Bayesian machine learning and information processing	De Vries	EE		5
6EMA53	Molecular photophysics	Janssen	ST		5
6MSM10	Physical organic chemistry	Sijbesma	ST		5

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## Suggestions for Free electives

- ❖ Courses from Eindhoven School of Education (ESoE)
- ❖ Career development (8GM00, 2.5 EC)
- ❖ BiTT project (8GM10, 2.5 EC)
- ❖ Relevant courses at other departments, such as:

Code	Course name	Lecturer	Dep	EC
0LM140	Let's make humans better	Frank	IEIS	5
0LM120	Perspectives on medical technology	Nickel	IEIS	5
1CM190	Health care operations planning	Dellaert	IEIS	5
1JM06	Human aspects of innovation	Gevers	IEIS	5
1ZM16	Management of product development	Sihag	IEIS	5
1ZM20	Technology entrepreneurship	Bobelyn	IEIS	5
1ZM90	Open innovation	Clodt	IEIS	5
2IPC0	Programming methods	Cleophas	W&I	5
2IX20	Software specification	Keiren	W&I	5
2AMM20	Research topics in data mining	Duivesteijn	W&I	5
2MMA80	Mathematics for neural networks	Smets	W&I	5
2MMS20	Statistics for big data	Van den Heuvel	W&I	5
3MS010	Advanced fluid dynamics	Clercx	TN	5
4CM00	Control engineering	Witvoet	W	5
4LM50	Rheology/Computational rheology	Cardinaels	W	5
5LMA0	Model reduction	Weiland	EE	5
5SMC0	Control principles for engineered systems	Özkan	EE	5
5SSC0	Adaptive array signal processing (prior knowledge 5XSB0 required)	Van Sloun	EE	5
5SSD0	Bayesian machine learning and information processing	De Vries	EE	5
6EMA51	Characterization of materials	Friedrich	ST	5
6MSM31	Polymer and colloid science	Tuinier	ST	5

Please check OSIRIS for the current programming

# = basic course for electrical engineering in signal processing

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## ❖ Projects

- 8ZM92/91: Extending graduation project 10/15 EC (ME)
- 8ZM97/98/99: Extending externship 5/10/15 EC (BME/ME)

## ❖ BSc courses level 3 (advanced), check Osiris if they are taught in English or Dutch

Maximum 15 EC of BSc courses

Code	Course name	Lecturer	Q/TS	EC
8DC00	Medical image analysis	Van Eijnatten	1/E	5
8RC00	Pharmacology	Brunsveld	1/A	5
8TB10	Structure and function of joints	Foolen	1/A	5
2DBM90	Applied biostatistical modelling	Rijkema	2/A	5
8LC00	Applied cell biology	De Boer	2/E	5
8P370	CBL Microscopy	Albertazzi	2/C	5
8VC00	Advanced imaging techniques	Lopata	2/D	5
6E3X0	Macro-organic chemistry	Palmans	3/B	5
8CB10	Simulation biochemical systems	Hilbers	3/C	5
8P340	Project Biomechanics	Van de Vosse	3/B	5
8P350	Project Tissue engineering	Smits	3/D	5
8P361	Project Imaging	Veta	3/E	5
8P380	Project Lab on chip	Gumuscu Sefunc	3/B	5
8TC20	Basic tissue engineering	Hofmann	3/C	5
8VB10	Measurements and modeling in the clinic	Lopata	3/A	5
8CB20	Synthetic and systems biology	De Greef	4/B	5
8CC00	Adv. Programming & Biomed. Data Analysis	Hilbers	4/B	5
8P313	Instrumental analysis	Abdelmohsen	4/A	5
8RB10	Bio-organic chemistry	Dankers	4/B	5
8VB20	Model based cardiovascular pathophysiology	Bovendeerd	4/A	5

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